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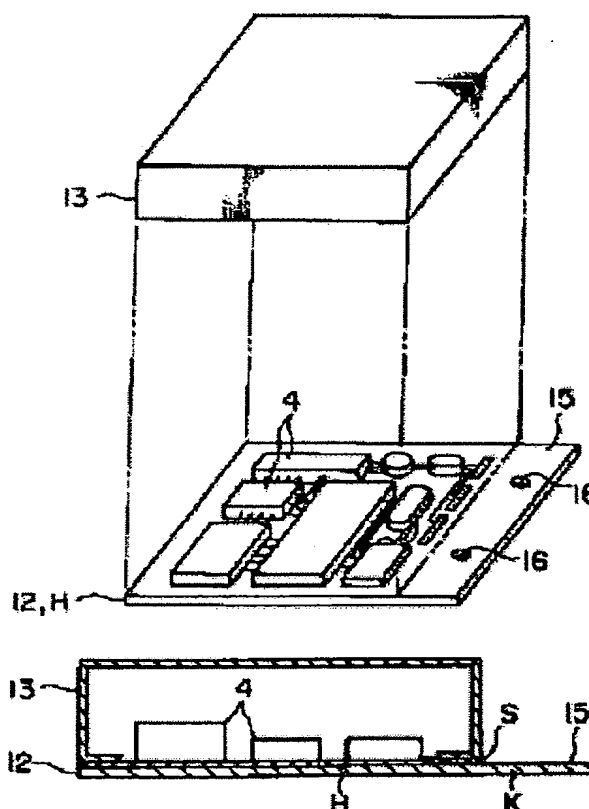
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### Abstract of JP5343871

**PURPOSE:**To contrive a miniaturization of a control box and the simplification of the control box as well as to ensure the good heat dissipation effect of the box.

**CONSTITUTION:**A case is constituted of a base plate 12 consisting of an enamel substrate H with a circuit pattern provided on the surface of a flat plate-shaped metal core K via an insulating layer S, such as an enamel layer, and an upper case 13 mounted over this base plate 12. Electric and electronic components 4, 4... are mounted on the circuit pattern of the base plate 12. One side part, which is extendedly provided from the case, of the base plate 12 is used as a fixed part 15, which is fixed on the body of a vehicle. The outer surface of the plate 12 and the fixed part 15 are formed in a state that the core K is exposed. An earth of the circuit pattern is made to have continuity with the core K.



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CLAIMS

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[Claim(s)]

[Claim 1]In a control box which each electric electronic component (4) is mounted in a case interior, and is attached to bodies, such as a car, A control box characterized for a radiation substrate (H) which provided a circuit pattern in the surface of a plate-like metal core (K) via an insulating layer (S) by all of said cases, or using in part and mounting said electric electronic component in a circuit pattern of this radiation substrate.

[Claim 2]The control box according to claim 1 where an outside surface of said radiation substrate is characterized by coming to expose said metal core.

[Claim 3]A control box given in claims 1 and 2 characterized by coming to \*\*\*\* that flank from a periphery of said case, and coming to make this \*\*\*\*(ed) flank into a holding part (15) fixed to bodies, such as a car, as for said radiation substrate.

[Claim 4]A control box given in claims 1 thru/or 3, wherein said metal core of said radiation substrate comes to flow with a ground of said circuit pattern.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to the control box carried in a car etc.

[0002]

[Description of the Prior Art]The control box which controls each device is conventionally established in electric system, such as a car. As this kind of a control box, as shown in drawing 5, there are some by which the printed circuit board 5 by which several kinds of electric electronic component 4 and 4 – were mounted in the case constituted by the case body 1 and the lid 2 was stored. The spacer 6, the mounting part 7 made to set up upwards via 6 –, and 7 – are provided in the case body 1 near the corner of the bottom plate.

By making the mounting hole 8 and 8 – which were formed near the corner of said printed circuit board 5 insert in this mounting part 7 and 7 –, fixing this printed circuit board 5 to them with a nut etc., and putting the lid 2 on them from the upper part of the case body 1 further, This control box is assembled.

The holding parts 9 and 9 attached to the flank of that case body 1 by welding etc. are formed in this control box.

This control box is attached to vehicles by fixing these holding parts 9 and 9 to the body of a car.

[0003]

[Problem(s) to be Solved by the Invention]By the way, if it is in the above control boxes, Since several kinds of electric electronic component 4 and the printed circuit board 5 in which 4 – is mounted are stored in the case, The inside of a case was filled with several kinds of electric electronic component 4 of this printed circuit board 5, and the heat generated from 4 –, and there was a problem of having an adverse effect on these electric electronic components 4 and 4 –. Since the printed circuit board 5 is attached to the spacer 6, the mounting part 7 made to set up via 6 –, and 7 –, the structure became very complicated, and caused increase of enlargement and part mark, and complication of structure, and assembly-operation nature was very bad. And the holding parts 9 and 9 had to be separately attached to the case body 1 by welding etc. for the attachment to vehicles, and there was a problem of causing a cost hike. In order to heighten a radiation effect, a cooling fin is formed in the outside surface side of the case body 1 as shown in drawing 6, As it is made to stick via the radiation sheet 10 grade which is excellent in thermal conductivity in the printed circuit board 5 and the bottom plate of the case body 1, and has insulation or is shown in drawing 7, Although there is also a thing which sticks the parts 4 and 4 especially with much calorific value to the inner surface of the case body 1 via the radiation sheet 10 and 10 grades, makes each electric electronic component 4 and the heat generated from 4 – transmit to the case body 1, and makes it radiate, If it was in such a control box, the internal structure and external shape were complicated further, and while assembly-operation nature worsened, there was a problem of causing a cost hike, further. In light of the above-mentioned circumstances, an object of this invention is to provide the cheap control box which was miniaturized simplified and was excellent in assembly-operation nature and heat dissipation nature.

[0004]

[Means for Solving the Problem]In a control box which each electric electronic component is mounted in a case interior in a control box of the 1st invention, and is attached to bodies, such as a car, A radiation substrate which provided a circuit pattern in the surface of a plate-like metal core via an insulating layer is characterized by all of said cases, or using in part and mounting said electric electronic component in a circuit pattern of this radiation substrate. A control box of the 2nd invention exposes said metal core, and an outside surface of a radiation substrate of the 1st invention is characterized by things. It is characterized by coming to \*\*\* a flank of the 1st and 2nd radiation substrates from a periphery of said case, and coming to make a control box of the 3rd invention into a holding part by which this \*\*\*(ed) flank is fixed to bodies, such as a car. It is characterized by said metal core of a radiation substrate of the 1st thru/or the 3rd invention coming to

flow a control box of the 4th invention with a ground of said circuit pattern.

[0005]

[Function]According to the control box of the 1st invention, the heat generated from each electric electronic component is transmitted to a radiation substrate very good, and is emitted to the exterior. Since all or some of case is used as the substrate by which component mounting is carried out, part mark are reduced and assembly-operation nature improves. According to the control box of the 2nd invention, the heat transmitted to the radiation substrate is radiated very good from the outside surface where the metal core of the radiation substrate was exposed. Since the flank of the radiation substrate \*\*\*\*(ed) from the periphery of the case is used as the body of vehicles, and the holding part fixed according to the control box of the 3rd invention, the necessity of providing a holding part separately can be abolished. According to the control box of the 4th invention, the whole can only make switch-on the body of vehicles and the ground of a circuit pattern which are grounds by fixing a holding part to the body of vehicles in order to attach a control box to vehicles.

[0006]

[Example]Hereafter, drawing 1 and drawing 2 explain one example of the control box of this invention. Identical codes are given to the same structure part as the above-mentioned conventional example, and explanation is omitted to it. As shown in a figure, the control box of this example comprises the upper housing 13 in which that case is attached to the upper part of the bottom plate 12 and this bottom plate 12. The bottom plate 12 on the surface of plate-like metal core K which consists of a carbon steel plate, stainless steel, copper, or aluminum, for example for example, It consists of the porcelain enamel board (radiation substrate) H which established the circuit pattern via the insulating layers S, such as porcelain enamel or alumina, and each electric electronic component 4 and 4 – are mounted in the circuit pattern of this bottom plate 12. The ground of this circuit pattern has flowed with metal core K of the porcelain enamel board H.

[0007]When this bottom plate 12 attaches the upper housing 13, it has a one side part \*\*\*\*(ed) from the periphery of the upper housing 13.

Let this one side part be the holding part 15 fixed to the body of vehicles with a bolt nut etc.

The numerals 16 and 16 are mounting holes in which a bolt etc. are inserted. The outside surface and the holding part 15 of the bottom plate 12 are made into a state without the insulating layer S, i.e., the state where metal core K was exposed. Thus, according to the above-mentioned control box, the porcelain enamel board H which provided the circuit pattern in the surface of plate-like metal core K via the insulating layers S, such as porcelain enamel, is used for the bottom plate 12 of a case, While mounting each electric electronic component 4 and 4 – to the circuit pattern of this bottom plate 12, the outside surface of this porcelain enamel board H, Since metal core K is exposed, each electric electronic component 4 and the heat generated from 4 – are transmitted to the bottom plate 12 very good, and radiates heat from this bottom plate 12 to the exterior efficiently. Therefore, it can be considered as the control box which was extremely excellent in the radiation effect, without forming the case body 1 in special shape, or complicating the fitting structure of the printed circuit board 5 or the electric electronic component 4, in order to heighten a radiation effect like before.

[0008]Since bottom plate 12 the very thing is used as each electric electronic component 4 and the substrate with which 4 – is mounted, structure for storing like before each electric electronic component 4 and the printed circuit board 5 in which 4 – was mounted in a case can be made unnecessary. Thereby, simplification of structure and reduction of part mark can be aimed at, and it can be considered as the miniaturized good control box of assembly-operation nature. And since the holding part 15 consists of a one side part of the bottom plate 12, it is not necessary to attach the holding parts 9 and 9 to the case body 1 separately by welding etc. specially like before for the attachment to the body. While being able to aim at reduction of a manufacturing cost, the very good attachment state to the body of the vehicles of a control box is securable.

[0009]Since metal core K of the bottom plate 12 and the ground of the circuit pattern have flowed, The whole can make switch-on the body of vehicles and the ground of a circuit pattern which are grounds only by fixing the holding part 15 to the body of vehicles in order to attach a control box to vehicles. Therefore, while being able to abolish the necessity of providing wiring in the body of vehicles, and the ground of a circuit pattern that the ground of a circuit should be secured, good noise-proof nature is securable. As shown in drawing 3 (a), it mounts in the porcelain enamel board H using only parts with much calorific value as the bottom plate 12 especially, A control box can be further miniaturized by mounting parts with comparatively little calorific value in the usual printed circuit board 5, equipping the upper part in a case with this printed circuit board 5, and wiring these bottom plates 12 and the printed circuit board 5.

[0010]As shown in drawing 3 (b), only the part where the parts with much calorific value of the outside surface of the porcelain enamel board H were mounted especially may be changed into the state where metal core K was exposed, and other portions may be covered with the upper housing 13. If it does in this way, it becomes possible to form a circuit pattern also in the undersurface side of the bottom plate 12 covered with the upper housing 13, high-density mounting of

the electric electronic component 4 and 4 – is enabled, and a control box can be miniaturized further. Although the control box of the above-mentioned example used as the porcelain enamel board H only the bottom plate 12 which constitutes the case, again, As shown in the whole case or drawing 4 (c), use the porcelain enamel board H for the upper surface and the undersurface of a case, or. It can be further considered as the control box which was excellent in the radiation effect and was miniaturized by constituting a case using the U-shaped porcelain enamel board H, as shown in drawing 4 (d), establishing a circuit pattern and mounting the electric electronic component 4 and 4 – in the inner surface side of these porcelain enamel board H.

[0011]

[Effect of the Invention]As mentioned above, according to the control box of this invention, the following effect can be acquired as explained. According to the control box of the 1st invention, a case uses the radiation substrate which provided the circuit pattern in the surface of the plate-like metal core via the insulating layer all or in part, Since each electric electronic component is mounted to the circuit pattern of this radiation substrate, the heat generated from each electric electronic component is transmitted to a radiation substrate very good, and radiates heat from this radiation substrate to the exterior efficiently. Therefore, it can be considered as the control box which was extremely excellent in the radiation effect, without forming a case body in special shape, or complicating the fitting structure of parts, in order to heighten a radiation effect like before. Structure for storing like before the printed circuit board in which each electric electronic component was mounted in a case can be made unnecessary. Thereby, simplification of structure and reduction of part mark can be aimed at, and it can be considered as the miniaturized good control box of assembly-operation nature. According to the control box of the 2nd invention, the outside surface of a radiation substrate can expose a metal core, and the heat transmitted to this radiation substrate can be made to radiate still better from things. Since a holding part consists of a one side part of the radiation substrate which constitutes a case according to the control box of the 3rd invention, It is not necessary to attach a holding part to a case separately by welding etc. specially, and like before, while being able to aim at reduction of a manufacturing cost, the very good attachment state to the body of the vehicles of a control box is securable. Since the metal core of a radiation substrate and the ground of the circuit pattern have flowed according to the control box of the 4th invention, The whole can make switch-on the body of vehicles and the ground of a circuit pattern which are grounds only by fixing a holding part to the body of vehicles in order to attach a control box to vehicles. Therefore, while being able to abolish the necessity of providing the wiring which makes it flowing through the body of vehicles, and the ground of a circuit pattern the ground of a circuit being secured, good noise-proof nature is securable.

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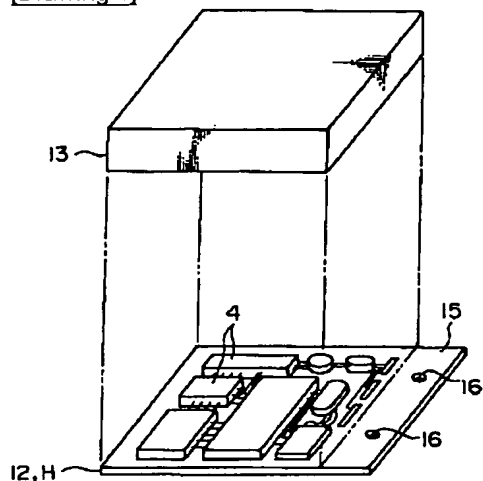
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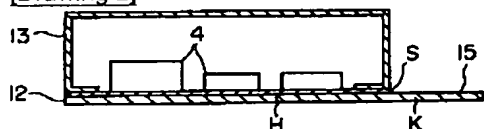
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## DRAWINGS

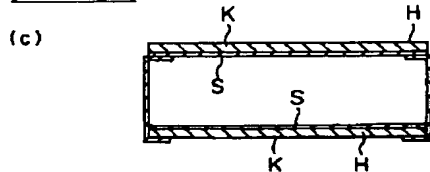
[Drawing 1]



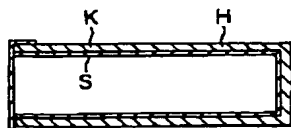
[Drawing 2]



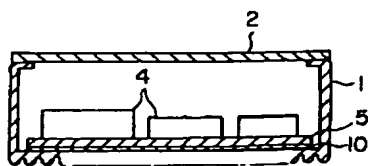
[Drawing 4]



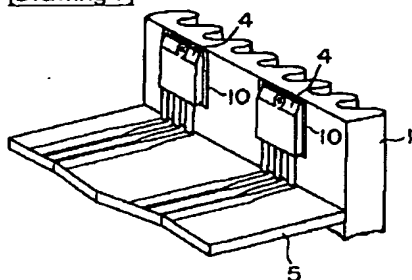
(d)



[Drawing 6]

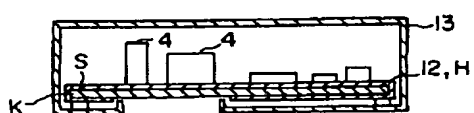


[Drawing 7]

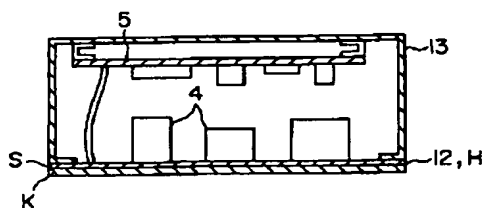


[Drawing 3]

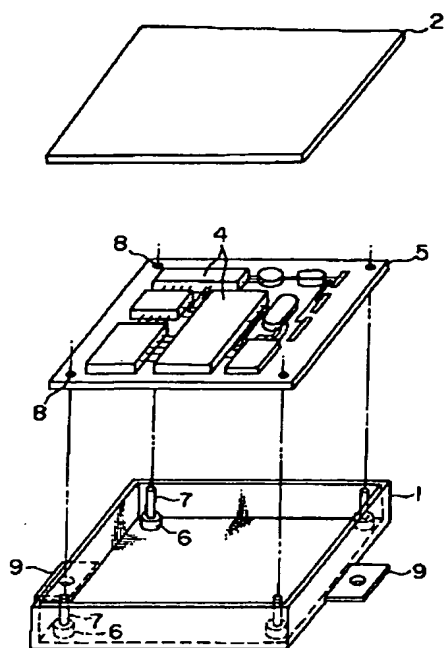
(a)



(b)



[Drawing 5]



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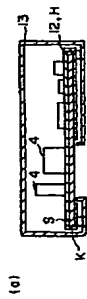




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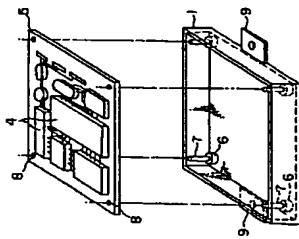
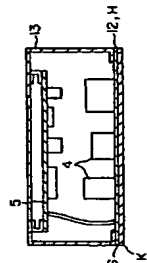
【図3】



【図5】



(b)



フロントページの続き

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